

## MAX RUN LENGTH FOR SPEC'd LOSS VOLTS; Feet R1.2

AWG>	#10	#12	#14	#16	#18	#20	#22	#24
	Max Loss; volts:			2.0				
Max Amps >	33	23	17	13	10	7.5	5	2.1
Fuse/CB Amps	30	20	15	12	10	7.5	5	2
Load; Amps								
1	1001	630	396	249	157	99	62	39
2	501	315	198	125	78	49	31	19
4	250	157	99	62	39	25	15	N/A
6	167	105	66	42	26	16	N/A	N/A
8	125	79	50	31	20	N/A	N/A	N/A
10	100	63	40	25	16	N/A	N/A	N/A
12	83	52	33	21	N/A	N/A	N/A	N/A
14	72	45	28	N/A	N/A	N/A	N/A	N/A
16	63	39	25	N/A	N/A	N/A	N/A	N/A
18	56	35	N/A	N/A	N/A	N/A	N/A	N/A
20	50	31	N/A	N/A	N/A	N/A	N/A	N/A
25	40	N/A	N/A	N/A	N/A	N/A	N/A	N/A
30	33	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ohms/K feet	0.9989	1.588	2.525	4.016	6.385	10.15	16.14	25.67

**NOTE:** Run lengths are out & back; ie a 100 ft run length is actually 200 ft of wire total.

Max amp ratings are as per recent Transwiki recommendations for general or enclosed wiring.

Resistance values are per various internet sources, for solid **copper** wires. Stranded values may be 2-3% higher.

Values are good for DC or single phase AC systems.

"N/A" means this amperage is higher than the max rating for this wire size.

### HOW TO USE:

1. Determine the design circuit current. This can be based on the fuse or CB rating, the anticipated device load, etc.
2. Determine the allowable loss. A 5 volt loss would be OK for house wiring since its only 4% of the nominal voltage.  
But for low voltages you should limit the loss to no more than 10-12%, otherwise performance will suffer.  
Eg; 2 volts loss is OK for an 18 volt system, but 1.4 volt loss would be max for a 12 volt system.
3. Decide on the voltage loss and plug the value into the yellow cell near the top. The new allowable wire lengths will be shown for each wire gauge. Using 1 volt instead of 2 volts for instance will reduce the wire lengths by 1/2.
4. Say we are using a Z-4000 with CB's rated at 12 amps. The table shows that #16 is the minimum wire size.  
We can see that at 12 amps the max runlength for #16 is 21 feet, to stay within the 2 volt loss.  
Likewise #14 allows runs up to 33 feet, and #12 runs up to 52 feet.
5. If we were to fuse at say 10 amps instead, we could use #18 for runs up to 16 feet, and run lengths for the larger sizes increase by roughly 20% in each case.
6. If you have several shorter track block runs and a couple that are longer, use heavier wire for the long runs only.
7. Make sure that there are no wires in the circuit that are lighter than the minimum for the CB or fuse rating.  
Or conversely, set the fuse or CB size to protect the lightest wire gauge used in the circuit.